Quality of Life and the Mobility of the Urban Homeless

A Senior Honors Thesis

Presented in Partial Fulfillment of the Requirements for graduation with research distinction in Economics in the undergraduate colleges of The Ohio State University

By

Daniel McKeever

The Ohio State University
May 2010

Project Advisor: Dr. Donald Haurin, Department of Economics

This study examines a number of variables related to the quality of life of unsheltered homeless persons in a sample of the 71 most populous U.S. cities in an effort to determine the distribution and the extent of the mobility of the chronically homeless. We outline a theoretical model for their mobility, drawing from the extant homelessness literature. We find partial empirical support for our model, with temperature and unemployment exhibiting significant relationships with the prevalence of unsheltered homelessness, but are unable to draw a definitive conclusion as to mobility.

I. Introduction[1]

For the past 30 or so years, a group of homeless men has gathered at the public-use outdoor chess tables in Washington, D.C.'s public-use Dupont Circle Park for the purpose of "hustling" chess—playing timed chess matches for money against tourists, passing pedestrians, and each other. The time limit for each player in each match is typically set at 5 minutes, regulated by an electronic timer, and the winner typically collects less than 20 dollars per match. Some of the park's best regular players are able to sustain themselves on their winnings from this activity (Tower, 2007).

The logistics of this activity, however, are of less interest than the activity's foundation—the chess tables in the public-use park. Were it not for this park and these ten tables furnished by the city, these individuals would never have been able to engage in the income-generating activity of "hustling" chess.

Observing these homeless men hustling chess led us to question the extent of the underlying dynamic: an activity that benefits the quality of life for the homeless related to an aspect of urban life, park space in this case, which is rarely cited in analyses of homeless populations.

While most of the literature on homelessness has focused on more conventional factors such as pressures in the job and housing markets, this paper intends to examine the relationship between the prevalence (concentration relative to area and population) of the chronically homeless and the levels of a number of more unconventional "quality of life" variables, such as park space, in large U.S. cities, with the goal of assessing the degree to which the chronically homeless are inclined or able to move from city to city. This analysis is rooted in the idea that there are certain factors in an urban environment that make that city either more favorable or less favorable for a chronically homeless person seeking to survive, and that, if the benefits outweighed the costs, a homeless

[1] We would like to extend our thanks to Dr. Donald Haurin and Dr. Bruce Weinberg of The Ohio State University Department of Economics and Dr. Hazel Morrow-Jones of the Austin E. Knowlton School of Architecture at The Ohio State University for their invaluable guidance, and to Ben Welle and Colleen Gentles at the Trust for Public Land for their assistance with obtaining park space data.

individual would migrate from cities with unfavorable conditions and/or into cities with favorable ones.

Although perhaps less obvious than the variables traditionally associated with homelessness, such as rent and employment pressures, we believe that there are sound theoretical bases for variables we introduce. In addition to park space, these variables attempt to account for the effects of city legislation that affects homeless survival strategies, weather, the cost of basic survival needs, and for the generosity of a given city's population. While traditional factors such as unemployment and rent levels will not be disregarded in our analysis, we place our focus on these quality of life variables in an effort to complement the existing analyses of urban homelessness.

While we are unable to find evidence to suggest that the chronically homeless moved in response to these variables over the time interval considered in our data, we find that the long-term settlement pattern of the chronically homeless has significant relationships with temperature and unemployment. Our theoretical explanations for these relationships are detailed in Section IV.

Our findings have implications for policy makers. As highly visible symbols of poverty, the chronically homeless challenge the credibility of policy makers through their presence in city parks and on city sidewalks. City government officials therefore have an incentive to reduce the presence of homelessness within city limits. Determining the degree to which certain quality-of-life variables, including city government policies, are related to homeless populations can provide a telling assessment of the efficacy of these policies at both the city and national level.

Addressing homelessness is equally challenging for economists. We base this statement on the previously mentioned considerations related to unconventional and largely immeasurable labor force activity, as well as the underwhelming amount of reliable and sophisticated data describing homelessness in America.

In section II of this paper, we review the relevant literature on urban homelessness. In section III, we describe in detail our theoretical model. In section IV, we describe our regression model and list our results. We conclude in section V, with a discussion of our results and recommendations for future research.

II. Review of relevant literature

Previous research has largely sought to explain the causes of homelessness at the margin between domiciled and homeless status, with less attention to the activity of the homeless once out on the street.

Most researchers have worked from two schools of thought. The first, the "individual deficit" framework, focuses on the role of personal problems and disabilities that hamper homeless individuals' chances of achieving stable housing (Wong and Piliavin, 1997). Poor physical health, severe mental disabilities, chemical dependency, social isolation, poor education, marginal employment history, domestic violence, and traumatic events during childhood (such as foster care) are all more common in the homeless population than in the general population.

Related to the "individual deficit" framework is a significant body of research that has focused on the demographic determinants of homelessness. Age, gender, race, and a history of incarceration or substance abuse have been shown to be predictive of the likelihood that an individual or family is homeless (Early, 2004) and the duration of homeless spells (Allgood and Warren, 2003).

Specifically, Snow et al. (1989) found that chronically homeless individuals in American urban centers were predominantly male, single, and under 40. Racial determinants depended on the size of a city and its minority base: larger cities with more minorities had more minority homeless, especially African-Americans. As to gender, it has been well-documented in the literature that homeless females, especially those with children, are prioritized by shelters, and are thus less likely to experience extended spells of unsheltered homelessness. Women may also join up with more financially stable men to avoid homelessness (Snow et al., 1989).

The chronically homeless also had a higher age-adjusted arrest rate for both serious and minor offenses than did the general population, but their crimes were significantly more likely to be minor and non-violent. Substance offenses made up half of all homeless arrests, and petty crimes such as shoplifting and unlawfully entering vacant buildings represented a substantial portion of the remainder (Snow et al., 1989).

The second school of thought, the "institutional resource" framework, examines the importance of material resources from formal and informal support systems (Wong and Piliavin, 1997). This approach is based on the idea that vulnerability to homelessness is explained by an individual's access to (and propensity for mobilizing) these resources, which include financial and housing support from family and friends, meal programs, income maintenance grants, welfare benefits, and psychiatric outpatient treatment services. Piliavin (1996) found that such institutional resources, particularly informal support from family and friends, played a larger role in explaining the likelihood that an individual would become or remain homeless. Our analysis extends this line of inquiry by examining the explanatory power of other highly informal support factors, such as park space.

The relationship between broader economic variables and homeless populations has also been examined. Quigley et al. (2001) propose that variations in homelessness are

caused by fluctuations in housing markets and income distribution. Bohanon (1991) found that local rent and unemployment levels explained a "great deal" of the variations in the rates of homelessness across 60 U.S. cities, and that household size and the percentage of the population in mental institutions were also significant. It should be noted that Piliavin (1996) also found that employment and receipt of housing subsidies were associated with a lower likelihood of returning to homelessness. As was previously mentioned, we have included data for rents and unemployment levels in our analysis.

Additionally, Honig and Filer (1993) successfully modeled homelessness (and forms of semi-homelessness, such as "crowded" and "doubled-up" housing) as a function of the relative levels of local labor markets, housing costs, and public assistance resources. They acknowledged, however, that "investigation of the causes of homelessness must go beyond housing markets alone…because of the special characteristics of the population at risk and the public policies that address their needs" (Honig and Filer, 1993, p. 248).

Similarly, in their analysis of HUD and Census bureau data, Troutman et al. (1999) concluded that homelessness is not "a housing problem per se," and argued that policies addressing homelessness should focus on funding for "other instruments of change" such as mental health programs and substance abuse treatment.

A number of researchers have recognized the multidimensional nature of homelessness, and have examined homeless populations from the viewpoint of the homeless individual. Their analyses move beyond the root causes of homelessness to inspect the same genre of quality of life variables that we include in our own analysis.

Speak (2003) presented a typology of homeless populations based on basic survival choices with respect to living situation, with the goal of identifying differences in the appropriate support policies necessary to support subgroups of the homeless population. Laurenson and Collins (2006) studied local government responses to homeless individuals living in public parks in New Zealand, arguing against criminalizing common behaviors of the homeless and for inclusive public park space for urban homeless populations. May (2003) examined the short- and long-term effects of legislation which restricts access to government resources for certain homeless individuals in the United Kingdom. Meert and Bourgeois (2005) analyzed the motivations and obstacles for homeless families living in parks in Belgium.

In a spatial analysis of the homeless population of Nashville, Tennessee, Lee (1989) found that the geographic distribution of the homeless had shifted as more homeless moved from indoor (sheltered) to outdoor (unsheltered) full-time environments. He also noted that the homeless had spread from the city's geographic core to its outskirts,

an observation which supports the level of our analysis (the limits of a city, not just its urban core).

Of greatest consequence to our study is the survey of mobility and the single homeless in Nottingham, England conducted by Whynes (1991). A voluntary survey of single homeless individuals, conducted through various assistance agencies, revealed that about one-third of the respondents had migrated to Nottingham from other locations, a pattern that was fairly consistent over the 15-month duration of the survey.

Whynes found that the chronically homeless were much more likely to have migrated from farther away (as opposed to the imminently homeless or those experiencing difficulties with their current housing situation). The chronically homeless migrants were also much more likely to be older, male, and unemployed than their newly homeless counterparts, and were more likely to have spent the night prior to responding sleeping in an unsheltered environment. The most distant migrants were also more likely to be affected by prolonged unemployment and housing instability.

Family and friends played a larger role in the lives of newly homeless persons, who were more likely to be using homelessness resources as the result of a relationship breakdown or the retraction of housing support from family and friends. By contrast, only one-quarter to one-third of those who migrated in from farther away had friends or relatives in the area with whom they had stayed the night before. The demographic characteristics of the chronically homeless found by Whynes are mirrored in the research by Snow et al. (1989), May (2003), and a number of similar studies.

With the exception of studies such as those listed above, the chronically homeless (particularly in the United States) have received the least attention, a fact that can in all probability be attributed to the lack of data regarding traditional variables (income, expenditures such as rent, and so on) for these populations. Because the economic "success" of a chronically homeless individual cannot be measured by conventional means such as income or assets, the definition of "success" must be modified for the homeless to mean the ability to meet basic survival needs in an urban environment. Consequently, this study focuses on the prevalence of homelessness in cities: for the homeless, survival is the best available metric of success.

III. Theoretical model

The acknowledgement by Troutman et al. and Honig and Filer that homelessness has more dimensions than housing and employment forms the foundation for our analysis. We seek to complement the research that has been conducted with regard to general or sheltered homeless populations and housing, employment, and social services by contributing an analysis of the variables that may affect the lives of unsheltered chronically homeless populations.

-*Sleeping*: The unsheltered homeless are faced with the prospect of sleeping in places not intended for human habitation. It stands to reason that the average quality of such a sleeping place could be highly variable from city to city.

To develop a proxy for the average quality of a city's street sleeping environment, we employ a number of variables. Because the unsheltered homeless could reasonably be expected to seek out public parks as a form of nighttime shelter, we include data for the number of acres of urban public park space in each city. Although the cross-sectional analysis conducted by Bohanon (1991) revealed no statistically significant relationship between climate and the size of a city's homeless population, that analysis considered the total homeless population in a given city, with the goal of teasing out the effects of rent and income variables. Our analysis considers only the unsheltered portion of the homeless population; thus, because of the obvious relationship between temperature and an individual's comfort level when sleeping in an outdoor environment, we include data for the average January temperature in each city.

Because some cities ban sleeping in public places with ordinances against public camping, sleeping, or lying, we also include data for the prohibition of these conducts in each city.

-*Personal freedoms*: City ordinances that criminalize the behaviors commonly associated with homelessness extend beyond sleeping habits. Other criminal behaviors that directly affect the chronically homeless include:

Obstruction of sidewalks or public places, or failing to disperse; loitering/loafing/vagrancy; sitting in particular public places; begging in an inopportune or improper fashion, or aggressive panhandling (definitions usually relate to factors including manner of communication and proximity to locations such as parking meters or ATMs); begging in public places; public urination/defecation; bathing in particular public waters; spitting; possessing shopping carts away from the premises of the owner; maintaining or storing junk, or rummaging/scavenging; street performance; entering a vacant building; creating odor; residing in a vehicle; bringing paupers/insane persons into the city; walking on the highway; washing cars or windshields; allowing vagrants to use one's property; offering to help park or watch over a car; being without a shirt; making unreasonable or improper noise.

Some cities have also required one or more of the following: the demolition of vacant property habitually inhabited by vagrants; the presentation of identification to public officers; and the closure of homeless encampments on public land (The National Coalition for the Homeless, 2006).

The number of these ordinances which are in effect varies greatly from city to city. Some cities are notoriously inhospitable; the National Coalition for the Homeless publishes a periodic report listing the "Top 20 Meanest Cities" with regard to homelessness, based on the frequency of the aforementioned ordinances and any anecdotal evidence of "mean" behavior toward the homeless.

Snow et al. (1989) argue that the ordinances mentioned above often represent the criminalization of behavior that would be completely legal for domiciled individuals, but is considered illegal when it is performed in public by those without the benefit of a home. For example, activities related to personal hygiene (urination/defecation, odor, bathing, being without a shirt) are considered innocuous when performed privately. The same can be said with regard to public intoxication or possession of an open container of an alcoholic beverage, which is illegal in almost every city. We do not suggest that cities should condone these behaviors, which pose public health problems, but it is important to remember that the homeless perform these activities in public primarily because they are without a private residence in which to do so.

In our analysis, we propose that the number of the aforementioned ordinances in effect in a given city reflects the likelihood that a homeless individual is performing a criminal activity. Because of the effect of these criminalized behaviors, and because of the aforementioned rates of all criminal offenses among the chronically homeless (Snow et al., 1989), we also include data for the number of full-time police officers in a city (divided by the city population at large). We propose that the number of police officers that patrol a given city population represents the likelihood that a homeless individual who is in violation of an ordinance will be confronted or charged, thereby reducing their quality of life and providing a motivation for migration.

-*Non-traditional opportunities for generating income*: The methods by which the homeless collect the income that sustains them are as varied as the homeless themselves, but some common methods, such as collecting returnable bottles and cans, are familiar to those with experience in an urban setting. The method that is perhaps the most visible to urban residents is panhandling.

As a proxy for the potential gains from panhandling, we include income data for each of the cities analyzed. We predict that cities with higher average levels of income would have a larger amount of disposable income, and thus might be more likely to donate to a panhandler; however, the cultural variables that might undermine this predicted relationship between socioeconomic standing and willingness to donate to panhandlers are beyond the scope of our analysis.

As we mentioned in the introduction, data on public park acreage can also be insightful as a measure of potential gains from panhandling. Parks can also provide financial opportunities from social interactions with passing pedestrians, park visitors, and other

homeless persons—recall, for example, the competitive chess "hustling" described in the introduction. We believe that it is reasonable to assume that other such activities occur in parks nationwide, although it would be impractical to attempt to assemble a comprehensive list.

We should also note here that public parks could also offer the benefits of a social network amongst the unsheltered homeless, including companionship and spiritual support, information-sharing (with respect to opportunities in employment, housing, and so on), and protection ("strength in numbers"). Indeed, the model for the duration of homelessness proposed by Wong and Piliavin (1997) includes "acculturation to street life" as one of its four key determinants. Such qualitative factors are beyond the scope of our analysis, but could strengthen the theoretical basis for including park acreage data in our analysis. It seems logical that a newly homeless individual could eventually become acclimated to unsheltered living (and join a network of similarly-advantaged contacts) in the same manner that a domiciled individual becomes accustomed to his home and his neighbors.

No analysis of income would be complete without comparing the expected potential gains with the level of the expected expenditures. If, for example, a city is rich in opportunity for successful panhandling, but the gains from panhandling have less purchasing power, then the homeless would have less opportunity to accumulate capital that could be put toward expenses above basic survival needs, such as housing, employment expenses (transportation fare, clothing, and so on), or travel. For this reason, we include yearly data from the ACCRA cost-of-living index for each city. While we would expect basic economic pressures to create a strong positive correlation between income levels and the cost of living in a city, the lack of such a correlation (or cities that are notably aberrant from this relationship) could prove to be telling about the strength of such an assumption or of our data.

It should also be noted that the homeless are more likely than the general population to experience alcoholism and addiction to other substances. These conditions create a highly inelastic demand for the relevant goods. If the cost of living index data include or are reflective of the costs of those goods, we might expect any effects of the cost of living to be more pronounced among the homeless population than among the general population. This could strengthen our theoretical model by helping to explain, at least partially, any negative correlation between the prevalence of homelessness and the cost of living.

We will analyze all of the variables listed above (in conjunction with the more traditional variables used in analysis of homeless populations) in an attempt to determine the extent to which the chronically homeless are mobile. We hypothesize that the chronically homeless would be either pushed from or pulled to a city based on some combination of the variables listed above.

Our basic regression model takes the form

$Hmlss = \beta_0 + \beta_1 Unemp + \beta_2 Rent + \beta_3 Inc + \beta_4 COL + \beta_5 WinTemp + \beta_6 ProhCon + \beta_7 Police + \beta_8 PrkSpc + \beta_9 Popn + \beta_{10} Area + \varepsilon 1$

Where[2]:

Hmlss = Number of unsheltered homeless
Unemp = Local area unemployment rate
Rent = Median gross rent
Inc = Median household income
COL = ACCRA cost-of-living index score
WinTemp = Monthly average of 24-hour mean January temperature
ProhCon = Number of prohibited conducts/12[3]
Police = Number of full-time city police officers
PrkSpc = Acres of designed park space
Popn = City population
Area = City area in acres

Table 1 outlines our theoretical explanations and expected signs for the explanatory variables we use in our model, considering the possible outcomes for the mobility of the chronically homeless:

Table 1

Variable	**Explanations (assuming mobility)**	**Expected sign**	**Explanations (assuming no mobility)**	**Expected sign**
Unemp	Higher U is repellent (homeless will seek areas with lower U with the hope of gaining employment)	Negative	Higher U → more renters or homeowners unable to afford payments → become homeless → more H	Positive
Rent	Higher R is repellent (homeless will seek areas with lower R with the hope of becoming domiciled)	Negative	Higher R → more renters are priced out of housing market → more H	Positive

[2] See Appendix B for a detailed analysis of the composition each of our variables.

[3] The National Coalition for the Homeless, from whose report we obtain our data for this variable, considers 12 primary prohibited conducts in its reporting. We therefore divide the number of conducts prohibited in a given city by 12 to express the portion of conducts commonly associated with the chronically homeless that are prohibited.

Inc	Higher I is attractive (more donors to beggars, more tax dollars for social services)	Positive	Higher household I lowers likelihood that renter or homeowner will become homeless → fewer H	Negative
COL	Higher C is repellent (harder to buy basic, demand-inelastic goods, homeless will migrate to areas with lower C)	Negative	Higher C → struggling homeowners cannot afford housing → become homeless	Positive[4]
WinTemp	Sleeping outside in lower temperatures is repellent	Positive	No ability to escape low temperatures, even if sleeping outside	None
ProhCon	More aspects of homelessness illegal will be repellent	Negative	More laws put in place because of large homeless populations	Positive
			More illegal acts cause the incarceration of more homeless → population on street decreases	Negative
Police	More policing is repellent	Negative	Laws put in place because of large homeless populations	None
PrkSpc	Fewer parks → fewer sleeping spaces → homeless will seek areas with more sleeping spaces → repellent	Negative	No ability to change venues for outside sleep	None
	Park funding comes at the expense of funding for social services → homeless will seek areas with better-funded social services → repellent for high levels of G, attractive for low levels of G	Negative		
	Park funding comes from larger local tax base from wealthier citizens → no loss of funds to social	Positive		

[4] Rent is one of six main expense categories used in calculating the ACCRA cost-of-living index (Review of the COLI methodology, 2009).

	services, same attractive effect as I			
Popn	More populous cities will have economies of scale and scope for social services, employment and housing opportunities (see Section IV), which will attract the homeless	Positive		
Area	More area offers greater individual access to geographic resources (parks, passers by)	Positive	Individuals cannot move to take advantage of larger areas, correspondingly large populations	None

We suggest that most of the aforementioned variables are more likely to have a repellent "pushing" effect, rather than an attractive "pulling" effect. This aspect of our theoretical model is based on a cost-benefit analysis of migration for the homeless individual.

Because of the financial and social costs associated with migration, a negative change in a quality of life factor (for example, a decrease in park space) would have to be sufficiently intolerable to offset those costs for migration to occur. Similarly, the perceived long-term gains in quality of life from migration would need to be sufficient to offset the costs. We believe that quality of life variables are more likely to be repellent than attractive because of the immediacy of the repellent variables and the lack of information that a homeless individual may have about the levels of those same variables in other cities. If we define the net benefit N from migration as:

$$N = \Delta B - C$$

where ΔB is the anticipated increase in quality of life gained from migration, defined by the difference between the benefits B_2 from living in another city over the benefits B_1 of living in the current city B_1 ($\Delta B = B_2 - B_1$), and C is the cost of migration, then the nature of each variable leads us to conclude that a repellent effect is more likely than an attractive one.

If we assume that the correlation between the distance that a homeless individual migrates and the cost of that migration is positive, it is plausible that C is likely to be smaller in a repellent situation than in an attractive one. As a hypothetical example, if a

homeless individual in Los Angeles is faced with sufficiently intolerable increases in policing, he would only need to travel out of the city; if that same individual hears that there are jobs and cheap housing in New York City, he would need to take on the costs of travelling cross-country.

We propose that B_1 is always known by the decision-making individual, but that the level of B_2 is more easily estimated in a repellent situation (where B2 is the utility gained from escaping negative quality of life effects) than in an attractive situation (where B2 is the utility gained from enjoying positive quality of life effects elsewhere). Therefore, the level of ΔB, and thus the level of N, is more easily estimated in a repellent situation. We suggest that the relative ease of this estimation makes the repellent scenario more likely to inspire mobility.

However, the levels of some variables, such as temperature, are relatively stable in a given city from year to year, and are more likely to be accurately estimated than those of other variables. For example, we believe that a homeless individual would be more likely to be able to accurately predict the relative levels of temperature in San Diego and Minneapolis than the relative levels of unemployment in those cities.

In his survey research of homeless individuals entering Nottingham, England in 1991, Whynes noted that "the frequently-cited response of 'seeking work' would presumably indicate that, for individuals so replying, Nottingham is perceived to offer superior employment possibilities to their former location" (Whynes, 1991, p. 117). By way of anecdotal evidence, we also offer two instances in which homeless persons moved to a city based on the mistaken belief that jobs would be more readily available:

-"We were going to come here and then find work, you know, because there's always work in New York." "Once we found out we could keep our apartment, there was no point in staying here, because I can go back to my job in North Carolina." From a New York Times interview with a homeless couple who moved from Fayetteville, N.C. to New York City looking for work, but headed back after a city program paid for their transportation and back rent in Fayetteville, July 28, 2009 (Bosman, 2009).

-"[More people are becoming homeless] because they lost their jobs. Or they come here after people told them there were jobs, and then there aren't…More and more people want to go home. They say there are no jobs here. We hope some of these people can reach their families this weekend and that they say, 'Send him to us. We can take care of him.'" From a Las Vegas Sun interview with Annie Wilson, homeless liaison for the Las Vegas Metro Police, Dec. 10, 2008 (Pratt, 2008).

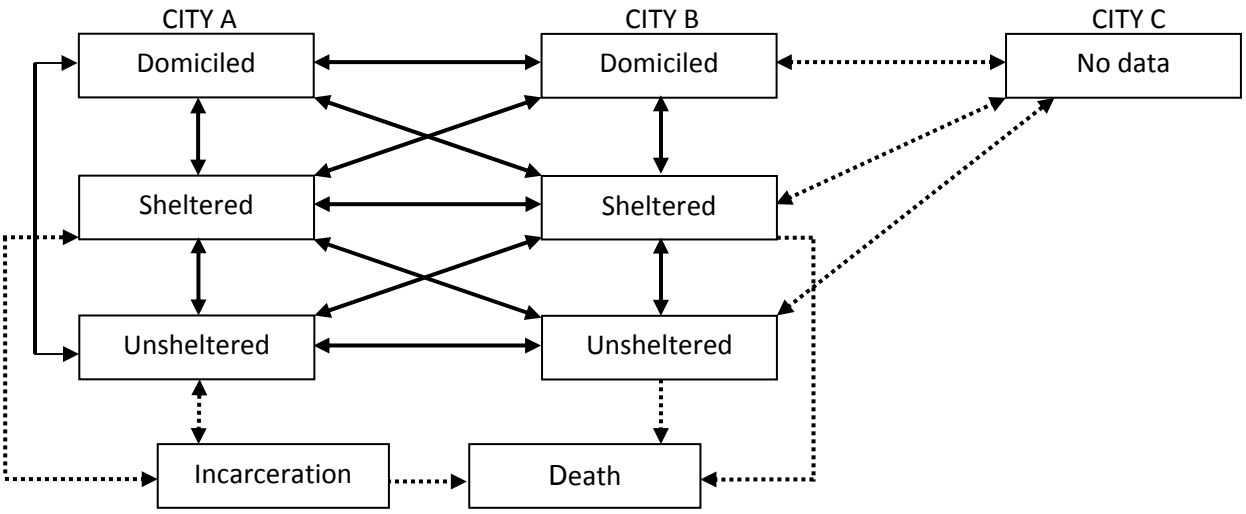
A preponderance of anecdotal evidence suggests the importance of unemployment pressures in agitating migration, as well as the homeless' apparent lack of complete information about these pressures in other cities.

i. Model considerations

Because we analyze data from populations, rather than individuals, there are limitations to our analysis. Without the ability to trace individuals in a population as their living situation changes, we can only determine when the aggregate homeless population increases or decreases. We are unable to distinguish between attractive and repellent effects; if a homeless population decreases, we are unable to tell if the homeless found the city intolerable or because another city became more appealing. We are therefore forced to rest on the case for repellent effects outlined in our theoretical model.

Another important modeling consideration is our inability to determine exactly where a homeless individual goes in the event that they do migrate. Figure 1 outlines what we believe to be the set of possibilities, based on the literature:

Figure 1



Arrows indicate possible directions of movements of interest to our study. Solid lines connect variables for which we have data; dashed lines connect variables for which we do not.

It is evident from this diagram that the scope of possibilities for homeless movements within and between cities is greater than the scope of our examination's data set. While we believe that our sample of 71 cities is substantial, we still leave the vast majority of U.S. municipalities uncovered; therefore, we cannot assess the possible factors that attract homeless individuals who migrate to one of those cities. Furthermore, we cannot determine if a person who has exited a homeless population has been incarcerated or died (rather than moving to another population category or another city).

We can, however, estimate the proportion of the homeless population that was involved in some of these transitions. The 2008 Annual Homeless Assessment Report to Congress

(AHAR), produced by the U.S. Department of Housing and Development (HUD), includes summary statistics for the previous nights' living arrangement for individuals and families entering the shelter system. Their findings are summarized in Table 2:

Table 2

Previous night's living arrangement	Total	Percentage of Individual Adults	Percentage of Adults in Families
Already Homeless	***37.2%***	***39.4%***	***25.9%***
Place not meant for human habitation	12.9%	14.7%	4.0%
Emergency shelter or transitional housing	24.3%	24.8%	22.0%
From Housing	***41.0%***	***37.0%***	***61.5%***
Rented or owned housing unit	12.5%	11.2%	19.2%
Staying with family	16.4%	14.2%	27.8%
Staying with friends	12.1%	11.6%	14.5%
From Institutions	***11.9%***	***13.6%***	***2.4%***
Psychiatric/substance abuse facility, hospital	6.7%	7.6%	1.8%
Jail, prison, juvenile detention	4.8%	5.6%	0.5%
Foster care home	0.4%	0.4%	0.1%
From other situations	***10.1%***	***10.0%***	***0.1%***
Hotel/motel or "other"	10.1%	10.0%	0.1%

Source: U.S. Department of Housing and Urban Development, 2009, p. 34

Analyzing these results with a focus on the chronically homeless, we see that about 40 percent of single adults entering the shelter system are already homeless, including 15 percent of single adults who were previously unsheltered. A comparable percentage of individuals comes from institutional settings, primarily from incarceration and treatment facilities. If we assume that these two categories provide a fair approximation of the chronically homeless, then about 30 percent of single adults entering the shelter system are among the chronically homeless population. This means that if we observe, for example, an increase in a city's sheltered homeless population, we could only reasonably expect 30 percent of that increase to be explained by chronically homeless individuals becoming newly sheltered.

If we find that our model generates robust results, we might conclude that the homeless are indeed mobile, and are able to improve their quality of life by reacting to the variables we consider. If, on the other hand, we find no support for our model, we might conclude that either a) we should reject our hypothesis, and conclude that the

homeless are not mobile, or b) some aspect of our model (the functional form, the data set, etc.) does not sufficiently address the question considered.

In the event that we reach either of the first two conclusions, this study could have profound implications for policy makers at several levels of government; these will be discussed in Section VI.

IV. Regression results

After testing a number of functional forms for our model, we found that the following double-log model[5] was significant at the $p < .05$ level (standard errors are listed in brackets and p-values for each variable in parentheses):

$$\ln(Hmlss) = -2.320 + 1.656 \ln(WinTemp) + 1.539 \ln(Unemp) + \varepsilon 1$$
$$\quad\quad [1.874] \quad [.411] \quad\quad\quad\quad [.151]$$
$$\quad\quad (.220) \quad (.001) \quad\quad\quad\quad (.028)$$

Adj. R^2: .218 F: 10.478 Sig.: .000

The regression results listed describe single-year findings from 2008. Nearly identical single-year results were obtained from 2007 and 2006. These results were not supported in the dynamic analysis of this model, which compared the absolute and percentage changes of the logged variables over one- and two-year periods.

We might suspect that multicollinearity would be a problem in this model given the influences of population (discussed further in Appendix D) or area; however, the model easily passes a variance inflation factor (VIF) test for VIF (β) < 5. The model also easily passes a Breusch-Pagan test for heteroskedasticity at the $p < .05$ level. We have no reason to suspect that serial correlation is present.

We also tested our model with an alternative specification for the dependent variable in an effort to account for the effects of large variances in city populations. We divided the unsheltered homeless population for a given city by its general population to derive PctUnsh, the unsheltered homeless percentage of the population. We found the following model to be significant:

$$\ln(PctUnsh) = -14.857 + 1.362 \ln(WinTemp) + 1.753 \ln(Unemp) + \varepsilon 2$$
$$\quad\quad [1.618] \quad [.396] \quad\quad\quad\quad [.593]$$
$$\quad\quad (.220) \quad (.001) \quad\quad\quad\quad (.004)$$

[5] Because the variables in our data set vary widely in their absolute terms (city populations often reach the millions, while other variables are specified as percentages), this double-log functional form allows us to derive meaningful associations from data that are placed on a standard scale.

Adj. R^2: .248 F: 12.519 Sig.: .000

This model also easily passes a variance inflation factor (VIF) test for VIF (β) < 5. The model also easily passes a Breusch-Pagan test for heteroskedasticity at the $p < .05$ level. Again, we have no reason to suspect that serial correlation is present.

This dependent variable specification is similar to that employed by Bohanon (1991), who divided the number of homeless by the number of a city's residents that were below the poverty line. Although we also pattern our double-log approach after Bohanon, our model is substantially different. We consider only the unsheltered homeless in constructing our dependent variable, while Bohanon considers the total homeless population. This is a critical distinction for two reasons:

-It stands to reason that the unsheltered homeless, faced with the prospect of sleeping outside, would be more likely to be affected by winter temperatures.

-Variables such as rent, income, and cost of living are more relevant to individuals in stable housing situations, from which sheltered individuals are more immediately removed than unsheltered individuals—as was discussed in the previous section, only about 15 percent of single homeless individuals entering the shelter system in 2008 had spent the previous night unsheltered. The chronically homeless, who may have adapted fully to the homeless lifestyle (Wong and Piliavin, 1997), are more likely to be among the unsheltered portion of the homeless population. This could explain the lack of a significant relationship between these variables and the unsheltered homeless populations in our model.

We propose the following explanations for the variables which were found to be significant:

Winter temperature: As was previously discussed, warmer temperatures present a clear advantage for the unsheltered homeless. The size of the coefficient is certainly intriguing, because it indicates that a one percent increase in temperature corresponds to an increase of about one-and-one-half percent in the prevalence of the unsheltered homeless in that city.

This relationship only reflects the long-term distribution of the unsheltered homeless, but its existence is telling as to the behavior of the unsheltered homeless. To some degree, unsheltered homelessness is a choice variable on the part of the individual. While alternative lifestyles are often unavailable or equally undesirable, the relationship revealed in our data demonstrates that in warmer climates, the homeless are more likely to remain unsheltered than to undertake an action (movement to another city, into the shelter system, or into another type of alternative living arrangement such as "doubled-

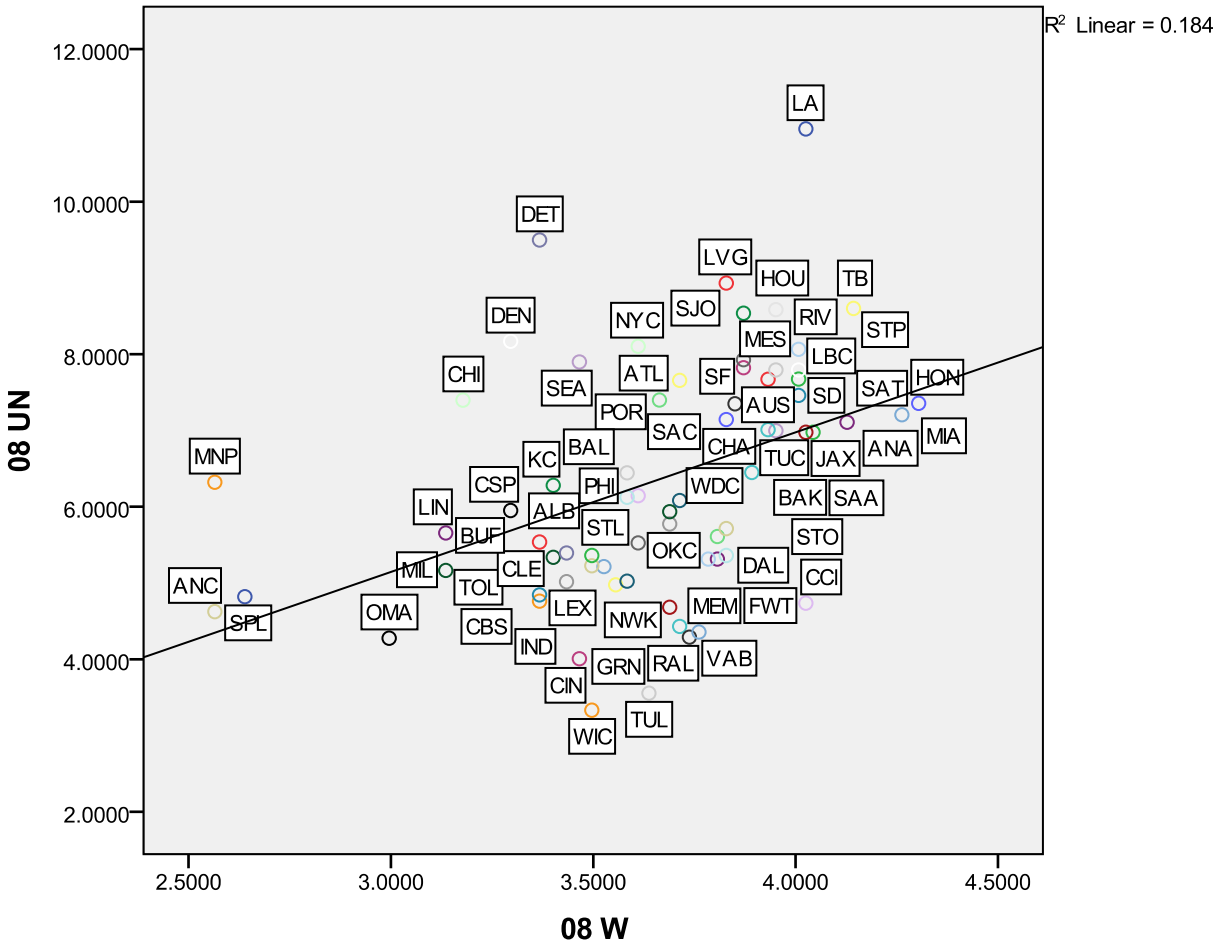
up" or "crowded" housing) that would lead to some form of sheltered living. This is a simple question of incentives. In balmy climates, unsheltered living is more tolerable than in colder climates. The few benefits of unsheltered living outweigh its low "cost" (at least in terms of temperature) to the individual. This net benefit is larger than the net benefit from some form of sheltered living, which could provide greater benefits but at greater costs (including monetary costs and non-monetary costs such as enforced sobriety or curfews).

To our knowledge, the only work other than Bohanon (1991) to address temperature in the homelessness literature was produced by Buss and Redburn (1986), who concluded that no meaningful relationship existed between climate and homelessness. They found that the homeless were appearing in cities that were undergoing periods of rapid economic and population growth, which happened to be in Sun Belt states.

Several key differences exist between that study and ours. First, we consider only the unsheltered homeless population, while it is unclear which homeless populations Buss and Redburn consider—a distinction that has already been examined in our discussion of Bohanon. Second, the pattern of urban economic and population growth has undoubtedly changed in the 25 years since the publication of that study. We found no significant relationship ($p<.05$), static or dynamic, between population or unemployment and temperature in our data.

Graph 1 shows the relationship between unsheltered homeless populations (08 UN) and winter temperatures (08 W), with points labeled by city. A key to city abbreviations can be found in Appendix E.

Graph 1



Unemployment:

As we might expect, economically depressed areas are home to larger unsheltered homeless populations. While we might expect that the unsheltered homeless would migrate in search of employment based on the anecdotal evidence in Section III, we are only able to observe the long-term distribution of the unsheltered homeless population because of the limitations discussed in Section V, the apparent relationship between unemployment and unsheltered homeless populations allows us to develop a theoretical two-stage mechanism for the emergence of an unsheltered homeless population:

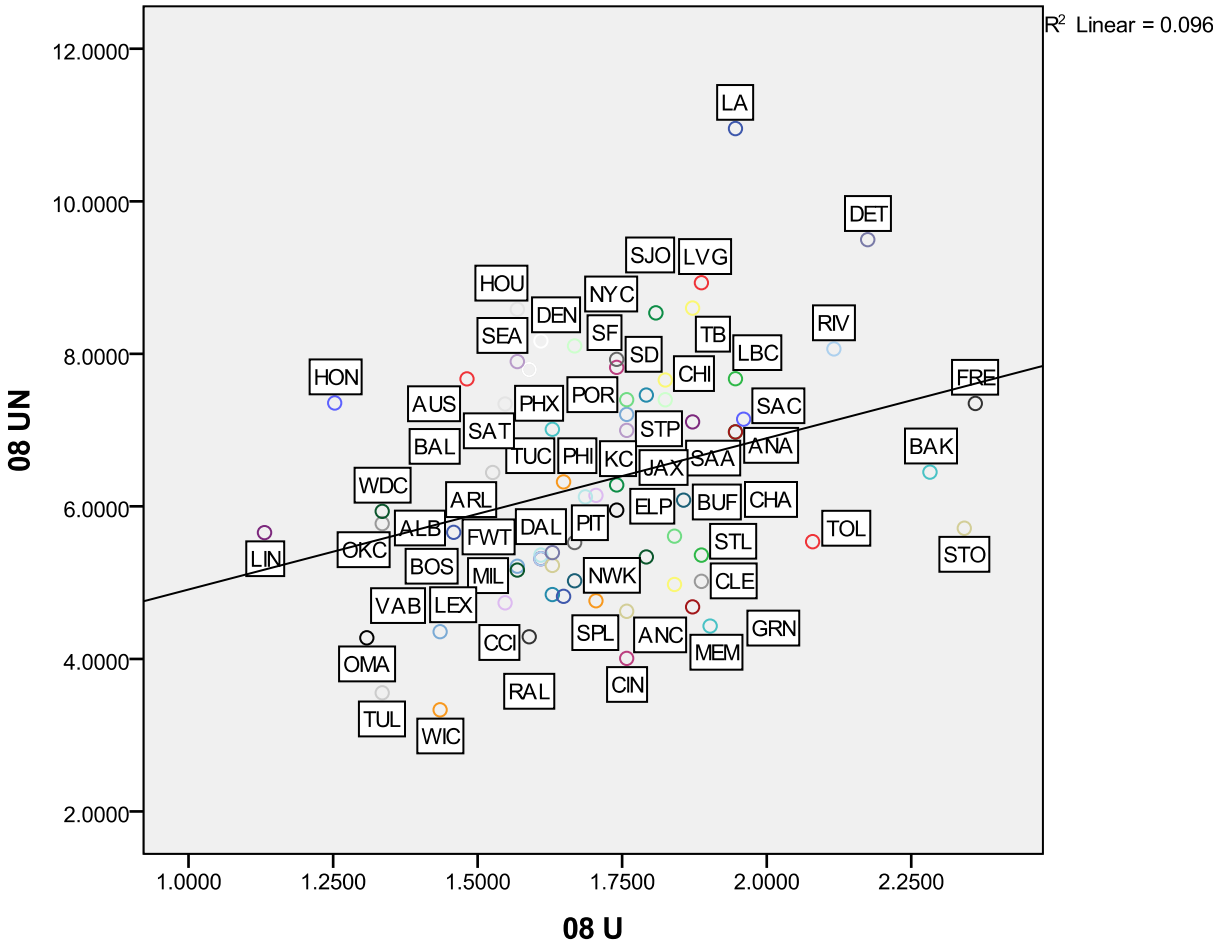
Stage 1: Economic depression leads to greater unemployment, which in turns leads to greater homelessness. While the newly unemployed might enter the shelter system rather than the unsheltered homeless population, they might also displace lower-priority homeless individuals from the shelter system, which is often operating with tight financial constraints.

Stage 2: In cities with warmer climates, the newly unsheltered homeless may choose to remain so rather than pursuing another means of shelter because of the previously outlined cost-benefit structure.

This analysis requires a fairly large assumption that the unsheltered homeless, who are more likely to experience mental illness and substance addiction, are able to perform these kinds of cost-benefit calculations. We believe, however, that the strength of the relationship between unsheltered homeless populations and temperature supports the notion that the unsheltered homeless are, to some degree, capable of making these calculations.

Graph 2 shows the relationship between unsheltered homeless populations (08 UN) and unemployment (08 U), with points labeled by city.

Graph 2



V. Conclusions

Based on the analysis above, we can assert with some confidence that meaningful relationships exist between the prevalence of the unsheltered homeless in major urban centers and two variables—one traditional economic variable (unemployment) and one less obvious quality-of-life variable (temperature). The implications of these findings for policy makers and economists will be discussed in subsection *i*.

As to the question of the mobility of the chronically homeless, we are only able to determine that the long-term settlement pattern of the unsheltered homeless reflects the aforementioned variables. Certain aspects of our data and our model prevent us from making a more detailed assessment of homeless mobility:

-Inconclusive timeframe: Our three-year sample (2006-2008) allows us to use highly reliable data, but this narrow window for examination does not lend itself to analyzing causality. Tests for the Granger-causality of our model of homeless prevalence were inconclusive, as the changes in homelessness ΔHmlss did not exhibit a significant relationship with the lagged changes in homelessness ΔHmlss_{-1} ($p = .113$) to determine Granger-causality.

-Problems with dynamic analysis: Attempting to analyze the changes in the variables we consider, rather than their levels, causes the regression coefficients to become distorted. (See Appendix D for a more detailed discussion of this issue.)

This difficulty prevents us from accurately analyzing the explanatory power of changes in the level of a variable. In an attempt to circumvent this obstacle, we employed alternative functional forms, including fixed-effect estimation (designating a dummy variable for all but one of the 71 cities we observed). These estimations did not generate significant results.

We cannot definitively conclude, then, that the chronically homeless lack mobility. It is worth noting, however, that their long-term settlement patterns do not have an apparent relationship with rent or income. Although the levels of these variables fluctuate from year-to-year, their basic structure is likely consistent over long time horizons for a given observation—for example, rents in New York have always topped the list of major cities.

A weak case for mobility based on traditional economic determinants speaks to the degree to which chronic homelessness is persistent for the individual and the factors which are most relevant in their individual cost-benefit analyses, and opens the door for further examinations like ours that attempt to explain chronic homelessness in terms of more informal quality of life variables.

i. Policy implications and recommendations for future research

The significant explanatory power of unemployment with regard to the long-term settlement pattern of urban unsheltered homeless populations deserves further examination for the benefit of policy makers and homeless advocates. (Temperature is obviously beyond the control of any government official.)

The policy responses by most cities to growing homeless populations have generally aimed to make their public spaces as repellent to homelessness as possible, primarily through the prohibition of conducts associated with homelessness (The National Coalition for the Homeless, 2006). and the closure of large homeless encampments (Pratt, July 2009).

For example, when faced with a swelling homeless encampment in a public area in Las Vegas, Mayor Oscar Goodman unveiled a plan to close the tent city and to legally prohibit feeding homeless persons (Skolnik, 2009). The anti-feeding ordinance was reversed following public outrage, but the attempt to close the tent city was just the most recent of many by the city government this decade—previous plans involved busing the homeless to a former prison 25 miles away, or asserting that the city government had a responsibility "in loco parentis" to force the chronically homeless to accept social services (Pratt, April 2009). (The latter never gained serious traction because of challenges to its constitutionality.)

Cities have also worked to prevent the attraction of migrating chronically homeless individuals. For example, the Ashland (OR) City Council shot down a proposal to designate a strip of land for a permanent encampment for the unsheltered homeless, citing concerns over safety and the possibility that the encampment would have a "Mecca effect," drawing chronically homeless individuals from all over (The National Coalition for the Homeless, 2006). May (2003) noted a similar anti-migrant response from city officials in his study of homeless individuals who migrated to the city of Brighton and Hove, England.

These concerns are well-founded, and we cannot fault any city government for aspiring to lower numbers of homeless individuals in their area. It is noteworthy, however, that our data do not reveal a relationship in our data between police presence or the prohibition of conducts associated with homelessness and the prevalence of the unsheltered homeless. Based on our analysis, it seems that these policies, at least in the aggregate, do not significantly reduce the long-term prevalence of homelessness. This finding has a clear implication for policy makers as well.

Although we are unable to determine the degree to which the chronically homeless are mobile within the short time span considered in our study, it is apparent from the

examples above that the migration of the chronically homeless is at least perceived by city officials to be a serious concern.

More importantly, we see, unsurprisingly, that city governments address the issue of homelessness only insofar as it relates to their city. There is a clear incentive for city governments to reduce homelessness, and repelling the chronically homeless is a fairly simple way to achieve that end.

In the case of New York City, the city has taken an active role in shuttling the homeless elsewhere. Mayor Michael Bloomberg's administration introduced a program that pays the costs of transportation for homeless individuals and families who volunteer to move elsewhere. The program's funds can even be used to pay for back rent and other living expenses in the destination city, if those costs are barriers to leaving New York (Bosman, 2009).

In the event that the homeless lack the ability to conduct the basic cost-benefit analysis outlined in Section III, or the means to mobilize after completing such an analysis, such a program could prove to be beneficial. While the program has been a success for New York (city officials say that none of the families whose trips it has sponsored have returned to New York shelters), homeless advocates generally disapprove of this type of strategy:

- "The city is engaged in cosmetics," Mr. Cohen said. "What we're doing is passing the problem of homelessness to another city. We're taking people from a shelter bed here to the living room couch of another family. Essentially, this family is still homeless." From a New York Times interview with NYC advocate Arnold Cohen (Bosman, 2009).

-"The bottom line," Roman said, "is that these people have complicated problems and need to be in housing with intensive services. Moving them around from one place to another is a whack-a-mole approach that doesn't solve the problem." From a Las Vegas Sun interview with Las Vegas advocate Nan Roman, reacting to Las Vegas officials' decision to crack down on tent cities (Pratt, July 2009).

Admittedly, a city government has next to no incentive for implementing holistic solutions that would address national determinants of homelessness. It is necessary, then, to address the problem on a national level in order to overcome the incentive structure outlined above.

To do so will require better data. As Troutman et al. (1999) note, "One of the central reasons for the paucity of academic investigations of the problem [of homelessness] has been the confusion surrounding the nature of homelessness and, most especially, the size of the homeless population" (p. 195). Whynes (1991) also acknowledged the difficulties of analyzing homeless populations with sparse data: "Given this lack of data

relating to the non-priority need homeless, the geographical mobility of such a population is particularly ill-understood" (p. 111).

We therefore urge capable national bodies to fund survey research of homeless individuals (of the type conducted by Whynes (1991), Snow et al. (1989), and others) in a broad cross-section of cities. These data could be standardized and incorporated into national-level analyses of urban homeless populations. Such an endeavor would be time-consuming and labor-intensive, but would overcome the need for a modicum of cooperation among researchers with diverse interests. Without a comprehensive, national-scale survey data set, we will be unable to undertake a complete analysis of the mobility of the chronically homeless—a problem which has national repercussions but which is primarily addressed by both policy makers and economists on a city-to-city basis.

References

Acres by percentage FY 2008-2006. (2009). [Data file]. The Trust for Public Land.

Allgood, S., & Warren, R. S. (2003, December). The duration of homelessness: Evidence from a national survey. *Journal of Housing Economics, 12*(4), 273-290.

Anaheim marketing jobs & Anaheim city information. (2010). *MarketingJobs.com*. Retrieved from http://www.marketingjobs.com/city/anaheim_marketing_jobs.html

Bohanon, C. (1991, December). The economic correlates of homelessness in sixty cities. *Social Science Quarterly, 72*(4), 817-825.

Bosman, J. (2009, July 28). City aids homeless with one-way tickets home. *The New York Times*. Retrieved from http://www.nytimes.com/2009/07/29/nyregion/29oneway.html

Buss, T. F., & Redburn, F. S. (1986). *Responding to America's homeless: Public policy alternatives*. Retrieved from Google Books database.

Columbus Division of Police. (2009). *2008 annual report*.

Early, D. W. (2004, January). The determinants of homelessness and the targeting of housing assistance. *Journal of Urban Economics, 55*(1), 195-212.

Federal Bureau of Investigation. (2008). *Table 78- Full-time law enforcement employees by state by city, 2008* [Data file]. Retrieved from http://www.fbi.gov/ucr/cius2008/data/table_78.html

History data. (2010). Retrieved from http://wunderground.com

Honig, M., & Filer, R. K. (1993, March). Causes of intercity variation in homelessness. *The American Economic Review, 83*(1), 248-255.

Huntsville, Alabama Chamber of Commerce. (2010). *ACCRA cost of living index* [Data file]. Retrieved from http://www.huntsvillealabamausa.com/new_exp/community_data/econ_performance/accra.html

Laurenson, P., & Collins, D. (2006, December). Towards inclusion: Local government, public space and homelessness in New Zealand. *New Zealand Geographer, 62*(3), 185-195.

Lee, B. (1989, May). Stability and change in an urban homeless population. *Demography, 26*(2), 323-334. Retrieved from JSTOR database.

Meert, H., & Bourgeois, M. (2005, January). Between rural and urban slums: A geography of pathways through homelessness. *Housing Studies, 20*(1), 107-125.

May, J. (2003). Local Connection Criteria and Single Homeless People's Geographical Mobility: Evidence from Brighton and Hove. *Housing Studies*, *18*(1), 29. Retrieved from Academic Search Complete database.

Population Division, U.S. Census Bureau. (2009). *Table 1: Annual estimates of the resident population for incorporated places over 100,000, ranked by July 1, 2008 population: April 1, 2000 to July 1, 2008 (SUB-EST2008-01)* [Data file].

Pratt, T. (2008, December 10). Annie Wilson, Metro Police's liaison to the homeless. *Las Vegas Sun*.

Pratt, T. (2009, April 14). Metro rethinks 'don't feed homeless'. *Las Vegas Sun*.

Pratt, T. (2009, July 31). Police breaking up homeless corridor. *Las Vegas Sun*.

Quigley, J. M., Raphael, S., & Smolensky, E. (2001, February). Homeless in America, homeless in California. *The Review of Economics and Statistics, 83*(1), 37-51. Retrieved from JSTOR database.

Review of the COLI methodology. (2009). *ACCRA cost of living index*. Retrieved from http://www.coli.org/Method.asp

Skolnik, S. (2009, April 3). Growing homeless settlement vexes businesses, Goodman. *Las Vegas Sun*.

Snow, D. A., Baker, S. G., & Anderson, L. (1989, December). Criminality and homeless men: An empirical assessment. *Social Problems, 36*(5), 532-549. Retrieved from JSTOR database.

Speak, S. (2004). Degrees of destitution: a typology of homelessness in developing countries. *Housing Studies*, *19*(3), 465-482.

Stats about all US cities. (2010). *City-data.com*. Retrieved from http://www.city-data.com/

The National Coalition for the Homeless, & The National Law Center on Poverty and Homelessness. (2006, January). *A dream deferred: the criminalization of homelessness in U.S. cities*. Retrieved from http://www.nationalhomeless.org/publications/crimreport/report.pdf

The National Coalition for the Homeless, & The National Law Center on Poverty and Homelessness. (2009, July). *Homes not handcuffs: The criminalization of homelessness in U.S. cities*. Retrieved from http://www.nationalhomeless.org/publications/crimreport/crimreport_2009.pdf

The Trust for Public Land. (2010, January 14). *Acres of parkland by city and agency FY 2006*.

The Trust for Public Land. (2010, January 14). *Acres of parkland by city and agency FY 2007*.

The Trust for Public Land. (2010, January 14). *Acres of parkland by city and agency FY 2008*.

Tower, W. (2007, September 30). The days and knights of Tom Murphy. *The Washington Post*.

Troutman, W. H., Jackson, J. D., & Ekelund, R. B. (1999, January). Public policy, perverse incentives, and the homeless problem. *Public Choice, 98*(1-2), 195-212.

U.S. Census Bureau. (2007). *American community survey 2006, table B19013* [Data file].

U.S. Department of Housing and Urban Development. (2009, July). *The 2008 annual homeless assessment report to Congress*.

U.S. Department of Labor, Bureau of Labor Statistics. (2006). *Unemployment rates for metropolitan areas* [Data file]. Retrieved from http://www.bls.gov/lau/lamtrk06.htm

U.S. Department of Labor, Bureau of Labor Statistics. (2007). *Unemployment rates for metropolitan areas* [Data file]. Retrieved from http://www.bls.gov/lau/lamtrk07.htm

U.S. Department of Labor, Bureau of Labor Statistics. (2008). *Unemployment rates for metropolitan areas* [Data file]. Retrieved from http://www.bls.gov/lau/lamtrk08.htm

Whynes, D. K. (1991, June). Mobility and the single homeless. *Area, 23*(2), 111-118. Retrieved from JSTOR database.

Wong, Y.-L. I., & Piliavin, I. (1997, August). A dynamic analysis of homeless-domicile transitions. *Social Problems, 44*(3), 408-423. Retrieved from JSTOR database.

Appendix A – Regression results

Table A-1 lists the critical summary statistics for our basic linear model (below) for all possible combinations of the years analyzed.

$\ln(Hmlss) = \beta_0 + \beta_1\ln(Unemp) + \beta_2\ln(Rent) + \beta_3\ln(Inc) + \beta_4\ln(COL) + \beta_5\ln(WinTemp) + \beta_6\ln(ProhCon) + \beta_7\ln(Police) + \beta_8\ln(PrkSpc) + \beta_9\ln(Popn) + \beta_{10}\ln(Popn) + \varepsilon 1$

Table A-1

Years	Adj. R-sq	Sig. of F	Sig. Xs	β	Sig.
2006	.237	.002	G	-.312	.018
2007	.244	.001	W	.210	.097
			G	-.221	.107
2008	.331	.000	W	.230	.066
			G	-.264	.047
			U	.205	.100
06-07 (lag)	.270	.001	G	-.325	.012
			N	.889	.076
07-08 (lag)	.292	.000	W	.229	.063
			G	-.288	.032
06-08 (lag)	.305	.000	G	-.391	.002
			N	.804	.100

Appendix B – Data considerations

To examine the relationship between the prevalence of homelessness and the levels of these quality of life variables, we constructed a custom panel data set that examines the relevant characteristics of the 77 most populous U.S. cities for each of three years (2006, 2007, and 2008).

Because we use data from a wide variety of sources, it is possible that comparisons between variables could be complicated by inconsistent definitions of the city area for which the data are recorded. For this reason, we have included Table B-1 (below), which lists the source of the data for each variable and a description of that variable's definition of the city area. We find that most definitions are consistent. For those that are different, we are required to assume that the errors caused by these differences are randomly distributed over our set of observations.

Table B-1

Variable	Source	Denominator	Description of area
Homelessness	HUD annual report	Continuum of Care (CoC)	Areas served by a network of care agencies; roughly correspond to metropolitan statistical areas (MSAs).
Park space	TPL reports	City limits	Acres within city limits owned by city, state, and federal agencies
Income, rent, cost of living	City-data.com records	City limits	Limits of incorporated place or census designated place
Police	FBI data	City limits	The number of full-time officers by city agency; certain neighborhoods or small suburbs within the city limits may have their own police units, which are not counted
Area	Census data	City limits	Limits of incorporated place or census designated place
Population	Census data	City limits	Limits of incorporated place or census designated place

Unemployment	Census data	Metropolitan statistical area (MSA)	Counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration (as measured by commuting to work) with the urban core; we might expect employment to have some degree of consistency across distances which are easily commuted
Temperature	Wunderground.com records	City proper	Specific central core area of city; distinction is largely irrelevant because the effects of temperature are felt across broader areas
Prohibited conducts	NCH report	City limits	City government jurisdiction; in some cases federal jurisdiction also applies
Area	Census data	City limits	Limits of incorporated place or census designated place

Because of the variety of sources that comprise our data set, we want to address what we believe to be the strengths and weaknesses of our data. We believe that the primary strength of our data set is that it allows us to approximate the mobility of the chronically homeless. We selected the variables used in our data set based on the demographic and behavioral characteristics of this specific subset of the homeless population that are cited in the literature.

For example, as was discussed in section II, the chronically homeless are more likely to be single and male than the overall homeless population. Shelters prioritize women (particularly those with families), so single males are more likely to remain unsheltered. The American Homeless Assessment Report divides homeless population counts into unsheltered and sheltered categories, allowing us to focus on the segment of the homeless population of interest. Because of the benefits that our theoretical model assumes that centrally located public parks offer to the chronically homeless, we are fortunate that our park acreage data differentiates between three types of park space (designed, undeveloped, and natural), allowing us to analyze designed acres specifically[6].

[6] "Designed areas (including water acreage) are parklands that have been created, constructed, planted, and managed primarily for human use. They include playgrounds, neighborhood parks, mini-parks, picnic meadows, sports fields, plazas, boulevards, and all areas served by roadways, parking lots and service

These strengths are offset by a number of weaknesses in our data set. First, our cost-benefit analysis for the mobility of a homeless individual is predicated in part on the assumption that the cost of migration increases with distance, but we could not find reliable historical data to support this assertion. Because variations in means of transportation, sources of transportation funding, and travel routes preclude us from collecting data for the cost of transportation to all possible destinations for a migrating individual, we must assume a constant cost in our analysis and turn our attention to the perceived quality of life benefits in a given city. (Section III includes further discussion of the costs of migration.) This weakness points to the importance of localized survey research in analyzing homeless populations, which is discussed in greater detail in Section V.

Additionally, ACCRA does not include data on taxation in their cost-of-living index assessments, citing the difficulty of estimating local, state, federal, and sales taxes. Because our research concerns the impoverished homeless, however, this consideration is probably only relevant given its potential to affect the amount of disposable income available to middle- and high-income city residents, whom the chronically homeless solicit for donations.

---

buildings and facilities" (The Trust For Public Land, 2010, p. 1)

Appendix C – Population pressures

Most of the explanatory variables proposed in our model are affected to some degree by population pressures. It is not difficult to imagine the mechanisms by which increased population brings about, for example, more police officers or a higher cost of living. Table X lists our expectations for the impact of increased population on the explanatory variables considered in our model, as well as the relevant measures of correlation and statistical significance when each variable was tested as dependent upon a sole explanatory variable, population. We use a static analysis of the levels of the variables for the year 2007 and a dynamic analysis of the change in the variables from 2007 to 2008. Relationships that are statistically significant at the $p < .05$ level appear in bold.

Table C-1

Variable	Expected sign	Justification	07 β	07 Sig.	07-08 β	07-08 Sig.
Rent	+	Rents bid up	.144	.210	.067	.561
Income	-	Wages bid down	-.016	.890	.112	.333
COL	+	Prices bid up	**.365**	**.001**	-.048	.679
Police	+	More demand for protection	**.966**	**.000**	-.015	.896
Parks	+	More demand for parks	-.016	.890	.124	.284
Count of unsheltered homeless	Uncertain		**.392**	**.001**	-.013	.914
Unemployment	Uncertain		-.022	.849	-.054	.643
Prohibited conducts	Uncertain		.008	.948	.171	.138
Winter temperature	None	No relation	.051	.660	-.182	.114
Area	+	More people need more area				

As expected, larger populations are associated with greater costs of living and larger numbers of police officers. These relationships deteriorate in the dynamic analysis, possibly because the coefficients of those regressions are distorted in OLS analysis and/or because the relationships are dependent on a longer time horizon to take effect than is examined in this study.

For those variables which do not appear to have a significant relationship with population, it is possible that the imprecision of some of the measurements in our data

set (see Appendix B, Table B-1) are responsible for the lack of an evident correlation. It is for this reason that we have controlled for population with respect to all of the variables in our model for which a relationship with population is evident.

Appendix D – Problem with dynamic analysis

To see why the dynamic form of our linear regression model fails to generate usable coefficients, consider our basic regression model, with each variable defined as the change in its level from 2007 to 2008:

$$Hmlss = \beta_0 + \beta_1 Unemp + \beta_2 Rent + \beta_3 Inc + \beta_4 COL + \beta_5 WinTemp + \beta_6 ProhCon + \beta_7 Police + \beta_8 PrkSpc + \beta_9 Popn + \beta_{10} Area + \varepsilon$$

When OLS is employed to analyze this regression, the resulting values for β are actually the difference between the values of β for the two years analyzed:

$$\beta_0 = \beta_0(2008) - \beta_0(2007)$$

As a result, the coefficients do not provide any meaningful information about the explanatory power of the right hand-side variables.

Appendix E – Key to City Abbreviations

ALB	Albuquerque, New Mexico	MEM	Memphis, Tennessee
ANA	Anaheim, California	MES	Mesa, Arizona
ANC	Anchorage, Alaska	MIA	Miami, Florida
ARL	Arlington, Texas	MIL	Milwaukee, Wisconsin
ATL	Atlanta, Georgia	MNP	Minneapolis, Minnesota
AUS	Austin, Texas	NSH	Nashville, Tennessee
BAK	Bakersfield, California	NWK	Newark, New Jersey
BAL	Baltimore, Maryland	NYC	New York, New York
BOS	Boston, Massachusetts	OAK	Oakland, California
BUF	Buffalo, New York	OKC	Oklahoma City, Oklahoma
CBS	Columbus, Ohio	OMA	Omaha, Nebraska
CCI	Corpus Christi, Texas	PHI	Philadelphia, Pennsylvania
CHA	Charlotte, North Carolina	PHX	Phoenix, Arizona
CHI	Chicago, Illinois	PIT	Pittsburgh, Pennsylvania
CIN	Cincinnati, Ohio	POR	Portland, Oregon
CLE	Cleveland, Ohio	RAL	Raleigh, North Carolina
CSP	Colorado Springs, Colorado	RIV	Riverside, California
DAL	Dallas, Texas	SAA	Santa Ana, California
DEN	Denver, Colorado	SAC	Sacramento, California
DET	Detroit, Michigan	SAT	San Antonio, California
ELP	El Paso, Texas	SD	San Diego, California
FRE	Fresno, California	SEA	Seattle, California
FWT	Fort Worth, Texas	SF	San Francisco, California
GRN	Greensboro, North Carolina	SJO	San Jose, California
HON	Honolulu, Hawaii	SPL	St. Paul, Minnesota
HOU	Houston, Texas	STL	St. Louis, Missouri
IND	Indianapolis, Indiana	STO	Stockton, California
JAX	Jacksonville, Florida	STP	St. Petersburg, Florida
JER	Jersey City, New Jersey	TB	Tampa, Florida
KC	Kansas City, Missouri	TOL	Toledo, Ohio
LA	Los Angeles, California	TUC	Tucson, Arizona
LBC	Long Beach, California	TUL	Tulsa, Oklahoma
LEX	Lexington, Kentucky	VAB	Virginia Beach, Virginia
LIN	Lincoln, Nebraska	WDC	Washington, D.C.
LOU	Louisville	WIC	Wichita, Kansas
LVG	Las Vegas, Nevada		